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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,466	03/23/2004	Shuichi Hirukawa	20455203200	1703

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EXAMINER	
SAYADIAN, HRAYR	

ART UNIT	PAPER NUMBER
2828	

DATE MAILED: 09/26/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/806,466	HIRUKAWA ET AL.	
	Examiner	Art Unit	
	Hrayr A. Sayadian	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

PRIOR ART REJECTIONS

1. Claims 1, 7, 9, 11, 13, 15, 17, and 19 are rejected under 35 U.S.C. 102(b) as being unpatentable over PGP U.S. Patent Application 2003/0048825, for inventor Hirukawa [hereinafter "Hirukawa"] further in view of Hurakawa's admitted prior art (HAPA). .

With respect to claims 1, 7, 9, 11, and 15:

Hirukawa discloses a semiconductor laser device (see FIG. 1 the growth of which is described by reference to FIGs. 2-4, see, for example, Column 3, ¶¶ [0056 and 0057]) in which, on an n-type GaAs substrate (Fig. 2, element 101, as described in ¶ [0057]), there are at least an n-type cladding layer (Fig. 2, element 103, as described in ¶ [0057]), a lower guide layer (Fig. 2, element 104, as described in ¶ [0057]), an InGaAsP quantum well active layer composed of one or a plurality of well layers and a plurality of barrier layers alternately disposed (Fig. 2, element 105, as described in ¶ [0057]), an upper guide layer (Fig. 2, element 106, as described in ¶ [0057]), and a p-type upper cladding layer (Fig. 2, element 107, as described in ¶ [0057]), that are stacked, wherein the quantum well active layer is stacked so that an n-side barrier layer is present on a side of the lower guide layer and a p-side barrier layer is present on a side of the upper-guide layer, the n-side barrier having thickness of 70Å or more (Fig. 2, element 105, as described in ¶ [0057], has an n-side barrier having 100 Å thickness), the upper and lower guide layers being AlGaAs with Al mole fraction greater than 0.2 (Fig. 2, elements 104 and 106, as described in ¶ [0057], have Al mole fraction of .35), the well layers having compressive strain and the barrier layers having tensile strain (Fig. 2, element 105, as described in ¶ [0057], has the wells with compressive strain and the barriers with tensile strain), said semiconductor laser device having an oscillation wavelength of more than 760 nm and less than 800 nm (See, for example, Hirukawa, Abstract and Column 1, ¶ [0010]).

Hirukawa fails to disclose the current blocking layer consisting of a sold layer. HAPA however discloses (see, paragraph [0005]) this modification and motivates it for the purpose of easing the oscillation of a single transverse mode.

To ease the production of a single transverse mode oscillation therefore it would have been obvious to make the current blocking layer consist of a solid layer. .

With respect to claims 13 and 17:

In Column 3, ¶¶ [0041] and [0042], Hirukawa discloses, quantities for well layer compressive strain and barrier layer tensile strain being less than 3.5%.

With respect to claim 19:

In Column 5, ¶ [0073], describing FIG. 7, Hirukawa discloses using device meeting the features and limitations of claim 1 in an optical disc unit.

2. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirukawa in view of HAPA, further in view of U.S. Pat. No. 5,636,236 to Tada et al. [hereinafter "Tada"].

With respect to claim 2:

The combination of Hirukawa and HAPA does not disclose making the p-side barrier thickness smaller than the n-side barrier thickness.

However, in the active region of a laser diode, Tada discloses making the width of the p-side barrier be less than that for the width of an n-side barrier.

And Tada motivates this modification to achieve uniform hole and electron carrier distribution. See, for example, Tada columns 4 and 6, lines 3-32 and 43-47, respectively.

Accordingly, it would have been obvious to modify the disclosure of Hirukawa as modified by HAPA to make the p-side barrier thickness smaller than the n-side barrier thickness to obtain uniform carrier distribution.

With respect to claim 3:

The combination of Hirukawa and HAPA does not disclose making the p-side barrier less than 70Å. Instead the three barrier layers in Hirukawa are disclosed as having 100, 70, and 100 Å thicknesses, respectively.

Again, Tada however discloses and motivates reducing the barrier width in the active regions of MQW diode lasers.

And Tada specifically discloses an embodiment wherein the n-side barrier width is 80Å and the p-side barrier width is 20Å for an InGaAsP active region MQW diode laser to obtain uniform carrier distribution. See Tada column 6, lines 42-47 describing the structure shown in FIG. 12.

Accordingly, it would have been obvious to modify the disclosure of Hirukawa as modified by HAPA to make the p-side barrier thickness less than 70Å to obtain uniform carrier distribution.

3. Claims 4, 8, 10, 12, 14, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirukawa in view HAPA, further in view of U.S. Pat. No. 6,127,691 to Fukunaga et al. [hereinafter "Fukunaga"] and U.S. Pat. No. 6,154,476 to Nishiguchi et al. [hereinafter "Nishiguchi"].

With respect to claim 4, 8, 10, 12, 14, 16, and 18:

The combination of Hirukawa and HAPA discloses all of the features and limitations recited in claims 4, 8, 10, 12, 14, 16, and 18 except for making the GaAs substrate p-type, as recited in independent claim 4.

Fukunaga however explicitly discloses that similar structures can be grown from/on p-type GaAs substrate. See, for example, Fukunaga column 6, lines 12-19.

Additionally, Nishiguchi discloses using a p-type GaAs substrate to grow laser diodes to allow using/integrating the laser diode with pnp transistors (which generally have higher operation speed than npn transistors) as the driving IC transistor. See, for example, Nishiguchi, column 1, lines 24-32, motivating the use of p-GaAs as the substrate for this specific motivation.

Accordingly, it would have been obvious to modify the disclosure of Hirukawa as modified by HAPA by using p-GaAs substrate instead of n-GaAs substrate to allow the easy integration with pnp transistors.

4. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirukawa in view of HAPA, further in view of Fukunaga, and Nishiguchi, further in view of Tada.

With respect to claim 5:

The disclosure of Hirukawa, as modified by HAPA, and as modified by Fukunaga, as motivated by Nishiguchi, does not disclose making the p-side barrier thickness smaller than the n-side barrier thickness.

However, in the active region of a laser diode, Tada discloses making the width of the p-side barrier be less than that for the width of an n-side barrier.

And Tada motivates this modification to achieve uniform hole and electron carrier distribution. See, for example, Tada columns 4 and 6, lines 3-32 and 43-47, respectively.

Accordingly, it would have been obvious to modify the disclosure of Hirukawa as modified by HAPA, as further modified by Fukunaga, as motivated by Nishiguchi, to make the p-side barrier thickness smaller than the n-side barrier thickness to obtain uniform carrier distribution.

With respect to claim 6:

The disclosure of Hirukawa, as modified by HAPA, and as modified by Fukunaga, as motivated by Nishiguchi, does not disclose making the p-side barrier less than 70Å. Instead the three barrier layers in Hirukawa are disclosed as having 100, 70, and 100 Å thicknesses.

Again, Tada however discloses and motivates reducing the barrier width in the active regions of MQW diode lasers.

And Tada specifically discloses an embodiment wherein the n-side barrier width is 80Å and the p-side barrier width is 20Å for an InGaAsP active region MQW diode laser to obtain uniform carrier distribution. See Tada column 6, lines 42-47 describing the structure shown in FIG. 12.

Accordingly, it would have been obvious to modify the disclosure of Hirukawa as modified by HAPA, as further modified by Fukunaga, as motivated by Nishiguchi, to make the p-side barrier thickness less than 70Å to obtain uniform carrier distribution.

5. Applicant's arguments have been considered but are found unconvincing.

Applicant argues that the "hollow portions in the current blocking layer of Hirukawa are essential in the ... device of Hirukawa." Contrary to Applicant's assertion however Hirukawa's

device would have worked, as Applicant admits in the response. The ability to ease the oscillation of single transverse mode, albeit at an expected lower power, does not "destroy the invention of Hirukawa." It simply modifies it, resulting in the inventions claimed in this application.

ADDITIONAL PRIOR ART OF RECORD

U.S. Pat. No. 6,504,171 to Grillot et al. is made of record as also disclosing and motivating chirping the barrier/well thickness or compositions, or both, to increase laser diode output by making uniform the distribution of electron and holes within the active region of the laser diode. U.S. Pat. No. 5,780,867 to Fritz et al. is made of record as disclosing adjusting thickness of active region barriers to control transport and distribution of carriers across different strained quantum wells.

CLOSURE

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hrayr A. Sayadian whose telephone number is (571) 272-7779. The examiner can normally be reached on Monday through Friday, 7:30 am to 4:00 pm, ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun O. Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER